

PATENT COOPERATION TREATY

REC'D 10 NOV 2005

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:
PHILIP R. WADSWORTH
QUALCOMM INCORPORATED
5775 MOREHOUSE DRIVE
SAN DIEGO, CA 92121-1714

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

08 NOV 2003

FOR FURTHER ACTION

See paragraph 2 below

Applicant's or agent's file reference

030226WO

International application No.

PCT/US04/15204

International filing date (day/month/year)

14 May 2004 (14.05.2004)

Priority date (day/month/year)

14 May 2003 (14.05.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): H04J 11/00 and US Cl.: 370/210

Applicant

QUALCOMM INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application


2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Date of completion of this opinion 14 October 2005 (14.10.2005)	Authorized officer Brian Nguyen  Telephone No. (571) 272-3084
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Form PCT/ISA/237 (cover sheet) (April 2005)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US04/15204

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☐ on paper
☐ in electronic form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
☐ filed together with the international application in electronic form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US04/15204

Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims 2-7, 9-14, 16-19 YES

Claims 1, 8, 15, 20 NO

Inventive step (IS)

Claims 10-11 YES

Claims 1-9, 12-20 NO

Industrial applicability (IA)

Claims 1-20 YES

Claims NONE NO

2. Citations and explanations:

Please See Continuation Sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US04/15204

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1, 8, 15, and 20 lack novelty under PCT Article 33(2) as being anticipated by Taylor et al (US 2003/0039317 A1).

Regarding claims 1, 8, 15, and 20, Taylor discloses a method and apparatus for estimating noise in an Orthogonal Frequency Division Multiplexing (OFDM) system, the method comprising: receiving OFDM symbols; and detecting a received power of a signal in an unassigned sub-carrier frequency band (see paragraph 0025).

Claims 2, 3, 6, 16-17, and 19 lack an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Magee et al (US 6,563,885 B1).

Regarding claims 2, 6, 16-17, Taylor does not specifically disclose averaging the received power with at least one previously stored received power measurement for the unassigned sub-carrier frequency band. However, Magee teaches the averaging (see col. 8, lines 47-52). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to average the received power as taught by Magee in the system of Taylor in order to smooth the noise estimates.

Regarding claims 3 and 19, Taylor does not specifically disclose demodulating prior to detecting. However, Magee discloses this feature (see 22 and 32 of figure 1 and col. 4, lines 28-34). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to demodulating prior to detecting as taught by Magee in the system of Taylor in order to meet specific needs.

Claims 12-13 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Walton et al (US 2003/0081538 A1).

Regarding claims 12-13, Taylor in view of Magee does not specifically disclose communicating the noise estimate to a transmitter. However, Walton discloses this limitation (see paragraph 0096). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to communicate the noise estimate to a transmitter as taught by Walton in the system of Taylor in order to adjust power to minimize interference.

Claim 4 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Rauschmayer (US 2003/0087651 A1).

Regarding claim 4, Taylor does not specifically disclose determining the unassigned sub-carrier frequency band based in part on a received message. However, Rauschmayer teaches this limitation (see control or training message in paragraph 0024). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the received message as taught by Rauschmayer in the system of Taylor in order to determine the carrier frequency availability.

Claim 5 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Chen et al (US 2002/019677 A1).

Regarding claim 5, Taylor does not specifically disclose determining the unassigned sub-carrier frequency band based in part on an internally generated sequence. However, Chen discloses this limitation (see hopping sequence in paragraph 0028). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the hopping sequence as taught by Chen in the system of Taylor in order to determine the carrier frequency availability.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Claims 7 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Lee et al (US 2003/0058953 A1).

Regarding claims 7 and 18, Taylor does not specifically disclose converting, removing, and transforming. However, Lee discloses this limitation (see figure 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to convert, remove, and transform as taught by Lee in the system of Taylor in order to process the received signal.

Claim 9 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Beadle et al (US 2003/0072392 A1). Regarding claim 9, Taylor does not specifically disclose determining a sum of a square of a quadrature signal component with a square of an in-phase signal component. However, Beadle discloses this limitation (see paragraph 0008). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determining as taught by Beadle in the system of Taylor in order to meet specific needs.

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Magee and Rauschmayer. Regarding claim 14, Taylor discloses a method of estimating noise in OFDM system comprising receiving and determining a power of a signal in a frequency band corresponding to an unassigned sub-carrier (see paragraph 0025). Taylor does not specifically disclose determining an unassigned sub-carrier and averaging the power of the signal. However, Magee teach the averaging (see col. 8, lines 47-52) and Rauschmayer teaches determining an unassigned sub-carrier (see control or training message in paragraph 0024). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to averaging the power and determining the unassigned sub-carrier as taught by Magee and Rauschmayer in the system of Taylor in order to meet the design criteria of a particular implementation.

Claims 10-11 meet the criteria set out in PCT 33(2)-(3), because the prior art does not teach or fairly suggest determining if the unassigned sub-carrier frequency band comprises a system wide unassigned sub-carrier frequency band; storing the detected received power as a noise plus interference estimate if the sub-carrier frequency band does not comprises the system wide unassigned frequency band; and storing the detected received power as a noise floor estimate if the sub-carrier frequency band comprises the system wide unassigned frequency band.